FLAME Facility

Flammability Assessment of Materials for Exploration

Types of investigations that can be accommodated

Ignition and flammability study of spacecraft materials in practical geometries and realistic atmospheric conditions.

Material Ignitability

- Spark ignition to support EVA suit design .
- Ignition studies for selection of cabin materials (similar to current NASA test).

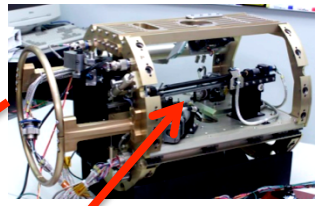
Fire Growth and Spread

Improved understanding of early fire growth behavior.
Validation of NASA materials flammability selection 1-g test protocols for low-gravity fires.
Validation of material flammability numerical models.

Fire Suppression

Suppression of burning materials by diluents, flow reduction and venting.

CIR Facility on ISS



CIR Insert –FLEX
(Similar to anticipated FLAME insert)

1-g simulation of Mir SFOG fire

Facility Capabilities / Approach:

- Develop FLAME facility (CIR insert and avionics) to support multiple solid-material combustion and fire suppression studies
- Utilize Combustion Integrated Rack (CIR)
- Support multiple investigations using common infrastructure:
  - Common interfaces and flow control
  - Removable test sections and sample holders
  - Removable ignition system

Point of Contact:

- David L. Urban, NASA-GRC, (216) 433-2835
- Gary A. Ruff, NASA-GRC, (216) 433-5697

Rationale:

Material Control is the first stage of spacecraft fire safety.

NASA has a long history of material controls but they are entirely based on 1-g understanding and data.

Future missions are expected to be in more hazardous atmospheric conditions.

Low-gravity testing has shown that current NASA material qualification methods may not be as conservative as they are believed to be.

6 PI's have been selected in a recent NRA to study material flammability with an anticipated down select to about 4 flight investigations.

A facility is needed to provide flight access for these investigations as they cannot be studied in ground-based facilities.